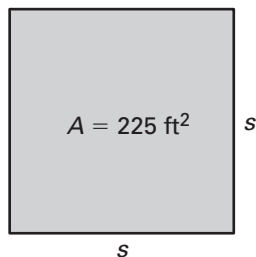


**Study Guide**

For use with pages 453–457

**GOAL** Find and approximate square roots of numbers.**VOCABULARY**A **square root** of a number  $n$  is a number  $m$  such that  $m^2 = n$ .A **perfect square** is a number that is the square of an integer.A **radical expression** is an expression that involves a radical sign.**EXAMPLE 1** Finding a Square Root

The area of a square is 225 square feet. Find the side length of the square.

**Solution**

The side length of the square is the positive square root of its area.

$$\sqrt{225} = 15 \text{ because } 15^2 = 225.$$

**Answer:** The side length of the square is 15 feet.**Exercises for Example 1**

Find the square roots of the number.

1. 25

2. 9

3. 100

4. 121

**EXAMPLE 2** Approximating a Square RootApproximate  $-\sqrt{60}$  to the nearest integer.

$$49 < 60 < 64$$

Identify perfect squares closest to 60.

$$-\sqrt{49} > -\sqrt{60} > -\sqrt{64}$$

Take negative square root of each number.  
Reverse inequality symbols.

$$-7 > -\sqrt{60} > -8$$

Evaluate square root of each perfect square.

**Answer:** Because 60 is closer to 64 than to 49,  $-\sqrt{60}$  is closer to  $-8$  than to  $-7$ . So, to the nearest integer,  $-\sqrt{60} \approx -8$ .**Exercises for Example 2**

Approximate the square root to the nearest integer.

5.  $\sqrt{14}$

6.  $\sqrt{26}$

7.  $-\sqrt{56.8}$

8.  $\sqrt{110.21}$

**Study Guide**

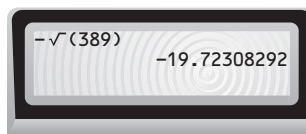
For use with pages 453–457

**EXAMPLE 3 Using a Calculator**Use a calculator to approximate  $-\sqrt{389}$ . Round to the nearest tenth.

Keystrokes

 $(-)$   $2^{nd}$   $[\sqrt{\phantom{x}}]$  389  $)$   $=$ 

Display

Answer:  $-\sqrt{389} \approx -19.7$ **Exercises for Example 3**

Use a calculator to approximate the square root. Round to the nearest tenth.

9.  $\sqrt{15}$

10.  $-\sqrt{95}$

11.  $-\sqrt{3.7}$

12.  $\sqrt{74.89}$

**EXAMPLE 4 Evaluating a Radical Expression**Evaluate  $\sqrt{3x^3 + y^2 - 2x}$  when  $x = 5$  and  $y = -9$ .**Solution**

$$\begin{aligned} 3\sqrt{x^3 + y^2 - 2x} &= 3\sqrt{5^3 + (-9)^2 - 2(5)} \\ &= 3\sqrt{196} \\ &= 3 \cdot 14 \\ &= 42 \end{aligned}$$

Substitute 5 for  $x$  and  $-9$  for  $y$ .

Evaluate expression inside radical symbol.

Evaluate square root.

Multiply.

**EXAMPLE 5 Solving an Equation Using Square Roots**Solve  $7x^2 - 5 = 562$ .**Solution**

$7x^2 - 5 = 562$

$7x^2 = 567$

$x^2 = 81$

$x = \pm\sqrt{81}$

$x = \pm 9$

Write original equation.

Add 5 to each side.

Divide each side by 7.

Use definition of square root.

Evaluate square root.

Answer: The solutions are 9 and  $-9$ .**Exercises for Examples 4 and 5**In Exercises 13–15, evaluate the expression when  $x = 10$  and  $y = 2$ .

13.  $\sqrt{5x^2 - 50y}$

14.  $-\sqrt{3x^2 - 22y}$

15.  $-\sqrt{8x + 2y^5}$

16. Solve  $3x^2 - 11 = 64$ .